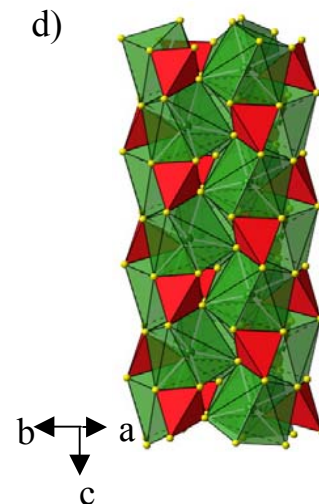
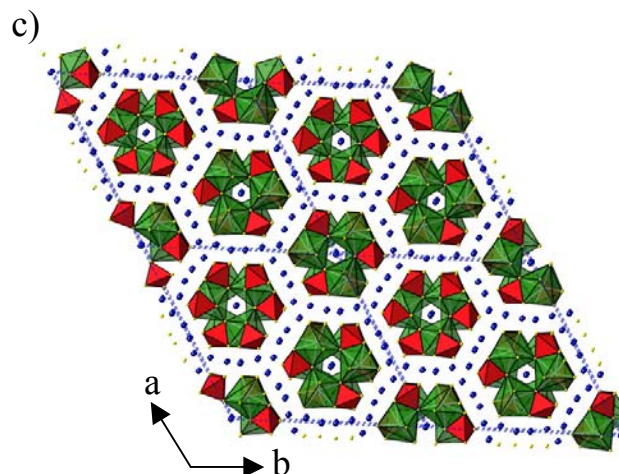
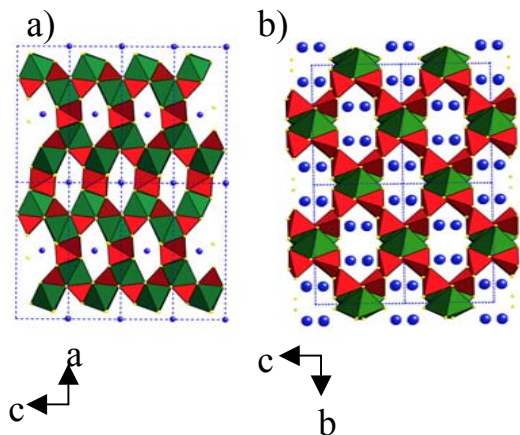


Rare-earth metal main group metal chalcogenide materials from molten salts

- New low-dimensional materials have been generated through phase-space searches.
- Low-temperature melts of alkali metal chalcogen salts act as solvents for rare-earth materials crystal growth.
- New luminescent and magnetic materials have been discovered



The effects of alkali metal choice are highlighted by the figures. At left, $A_2EuM^V_2Se_6$ ($A = Na, K, Rb, Cs$; $M = Si, Ge$) structures. In all structures, the alkali metals are shaded blue, Se yellow, $EuSe_n$ polyhedra are green, and M_2Se_6 polyhedra are red. a) $Na_2EuM_2Se_6$ ($M = Si, Ge$) viewed along the tunnel structure. b) $A_2EuGe_2Se_6$ ($A = Rb, Cs$) viewed parallel to the tunnels.

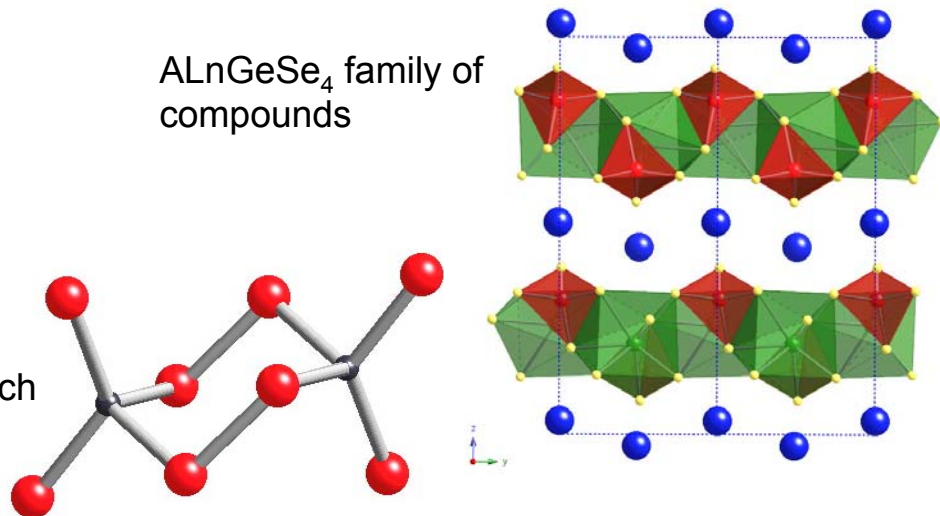
Above, the effects of changing the reaction conditions yield $NaEuGeS_4$ viewed c) along the c-axis, and d) perpendicular to $EuGeS_4$ channels.

Rare-earth metal main group metal chalcogenide materials from molten salts

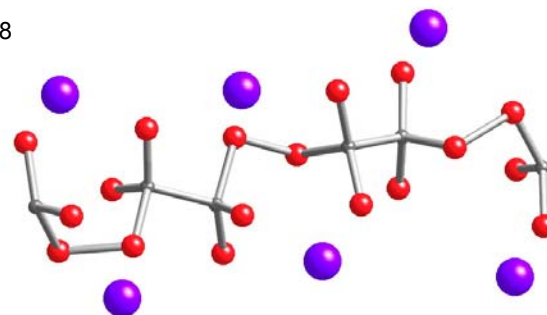
- Education Initiatives -

- Undergraduate Research (NSF funded)
 - Amy Gray: 2 publications
 - *Z. Krist.* 2003, 218, 19 and 20.
 - Angela Karst: NSF REU
 - Zeric Hulvey: NSF Solid State REU
 - *Inorg. Chem.* 2004, submitted.
 - Examples of compounds at right
 - Dorhout awarded Undergraduate Research Mentor Award, CSU
- Undergraduate Research Institute
 - “Research Connections” web site
 - Research fellowships in MPS for undergraduate scholars
 - Pilot program co-PI: Prof. Nancy Levinger
- Materials Chemistry Graduate Program of Study
 - Dorhout, Chair of new program in chemistry
 - Currently 8 students in program’s first year
 - \$10k internal CSU grant to hold symposium on the future of materials at CSU
 - Hosted the Colorado NanoTech Initiative conference at CSU

ALnGeSe_4 family of compounds



“Chair-type” unit of $[\text{Si}_2\text{Se}_8]^{4-}$ in $\text{Cs}_4\text{Si}_2\text{Se}_8$



Chains of $[\text{P}_2\text{Se}_6]$ in $\text{K}_2\text{P}_2\text{Se}_6$